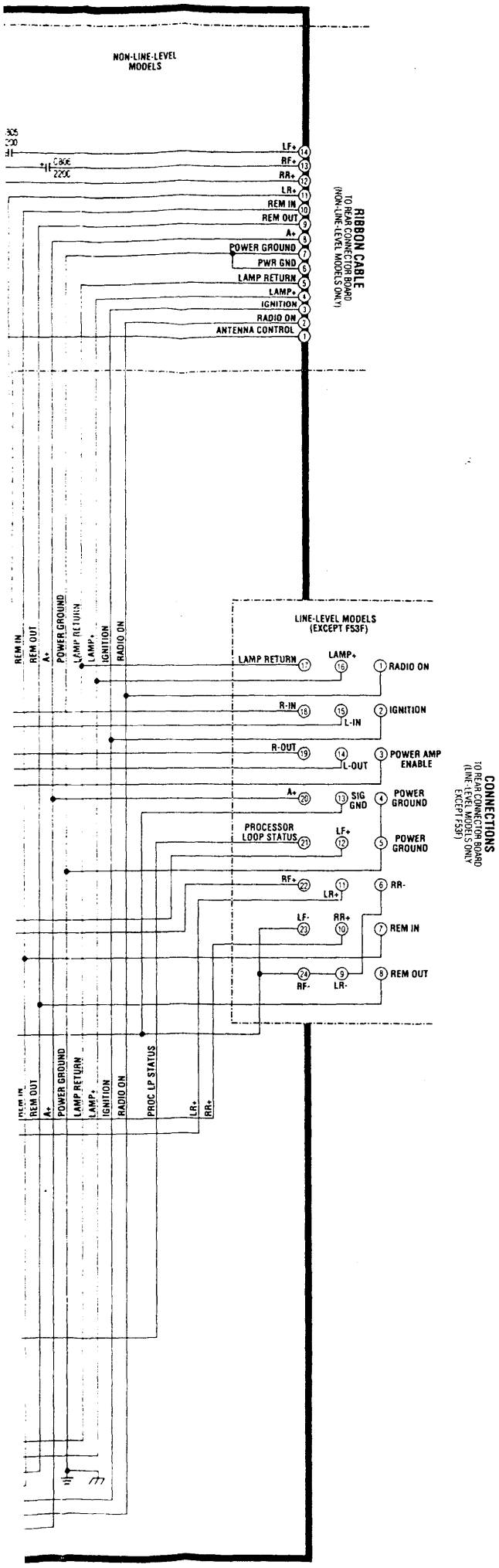
FORD CAR RADIO 2000

MODEL

SERVICE MANUAL



F32F-19B131-AA
F33F-19B131-AD
F4BF-19B131-AB
F4CF-19B131-AC
F4TF-19B131-AB
F4UF-19B131-AB
F4ZF-19B131-AA
F47F-19B131-AB
F48F-19B131-AB

F33F-19B132-BE
F37F-19B132-DF
F4BF-19B132-AB
F4CF-19B132-AC
F4CF-19B132-BC
F4SF-19B132-AB
F4TF-19B132-AB
F4TF-19B132-BB
F4UF-19B132-AB
F4XF-19B132-CA
F4XF-19B132-DA
F4ZF-19B132-BA
F48F-19B132-AB

F4ZF-19B132-

Transistor Voltages

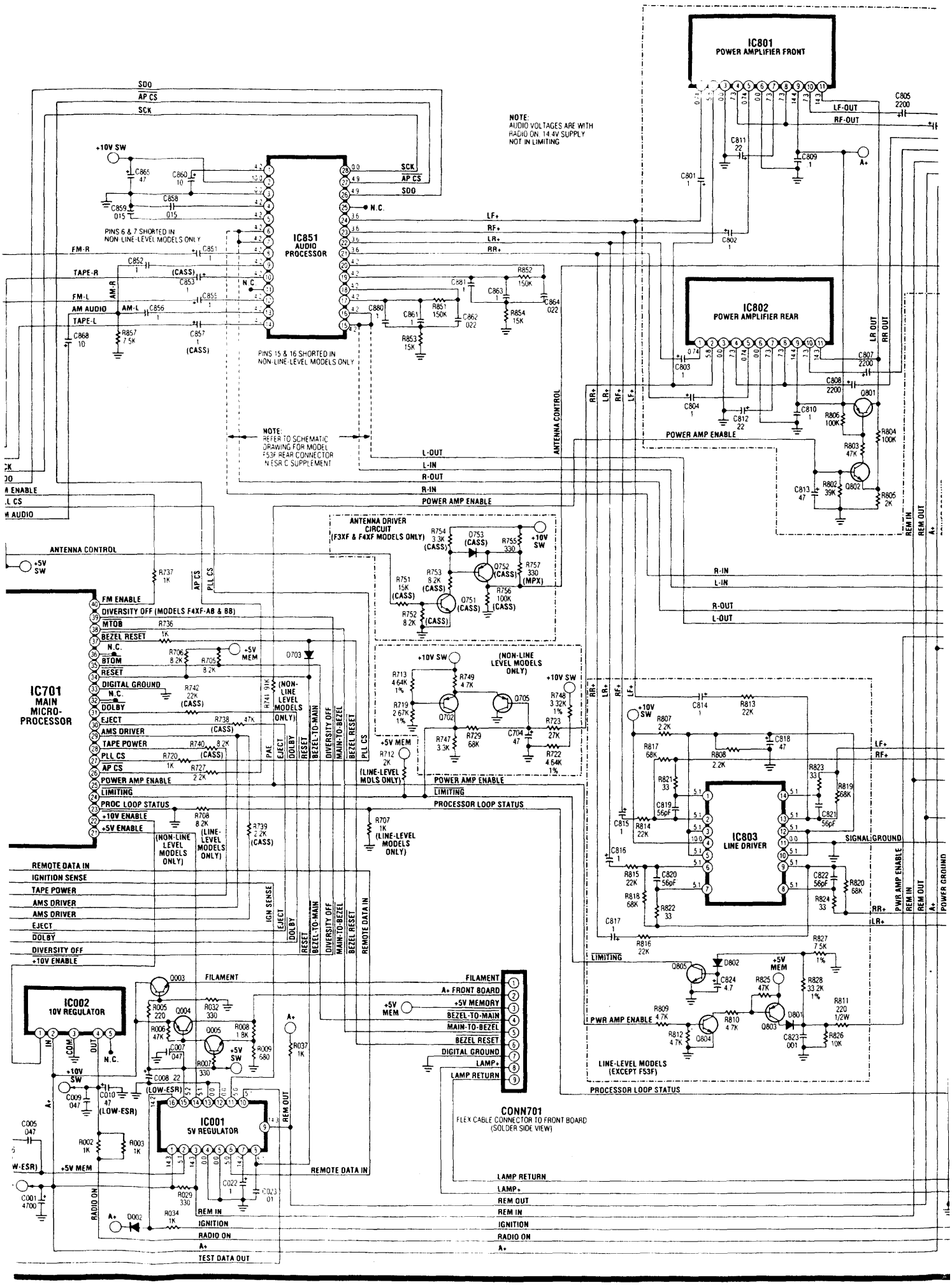
Trans.	E	B	C	Operation Mode/Comments
Q001	10.0	9.4	9.8	FM
	10.0	10.0	0.0	AM
Q002	4.4	5.0	9.4	FM
	0.0	0.0	10.0	AM
Q003	2.4	3.0	14.4	Ignition On
	0.0	0.0	14.4	Ignition Off
Q004	14.4	13.6	14.2	Ignition On
	14.4	14.4	0.0	Ignition Off
Q005	4.4	5.0	13.6	Ignition On
	0.0	0.0	14.4	Ignition Off
Q151	0.0	0.0	10.0	Not Tuning 50µV @ 87.9MHz
	0.0	0.0	0.0	Not Tuning <8µV @ 87.9MHz
	0.0	0.7 max.	0.2 max.	Tuning
Q152	10.0	10.0	0.0	Q-Not=10V
	10.0	9.3	9.8	Q-Not=0V
Q153	10.0	10.0	0.0	Q=10V
	10.0	9.3	9.8	Q-Not=0V
Q502	0.66	1.30	9.9	
Q503	0.67	1.14	5.1	
Q601	0.0	0.0	5.0	Dolby* On
	0.0	0.7	0.0	Dolby Off
Q641	S=0.0	G=5.0	D=0.15	AMS Pulse Mode
	S=0.0	G=0.0	D=14.4	Non-AMS
Q642	0.0	0.0	0.0	Initial Power On, Non-Tape
	0.0	0.0	9.5	Tape Mode/Audio Present
	0.0	5.0	0.2	AMS Output
Q661	S=14.4	G=0.2	D=14.4	Switch Tape Power On
	S=14.4	G=14.4	D=Open	Switch Tape Power Off
Q663	S=0.0	G=5.0	D=0.15	Eject
	S=0.0	G=0.0	D=14.4	Non-eject
Q664	0.0	0.7	0.2	Switch Tape Power On
	0.0	0.0	14.4	Switch Tape Power Off
Q702	4.3	3.7	4.0	
Q705	4.3	5.3	0.0	
Q751	0.0	0.20	0.13	Radio Off or Tape Playing
	0.0	0.69	0.10	Radio On and Tape Not Playing
Q752	0.14	0.14	0.0	Radio Off or Tape Playing
	9.7	9.0	9.7	Radio On and Tape Not Playing
Q801	14.4	13.7	14.3	
Q802	0.8	1.4	1.0	
Q803	5.0	4.3	4.9	
Q804	0.0	0.7	0.1	
Q805	0.0	0.55	4.9	

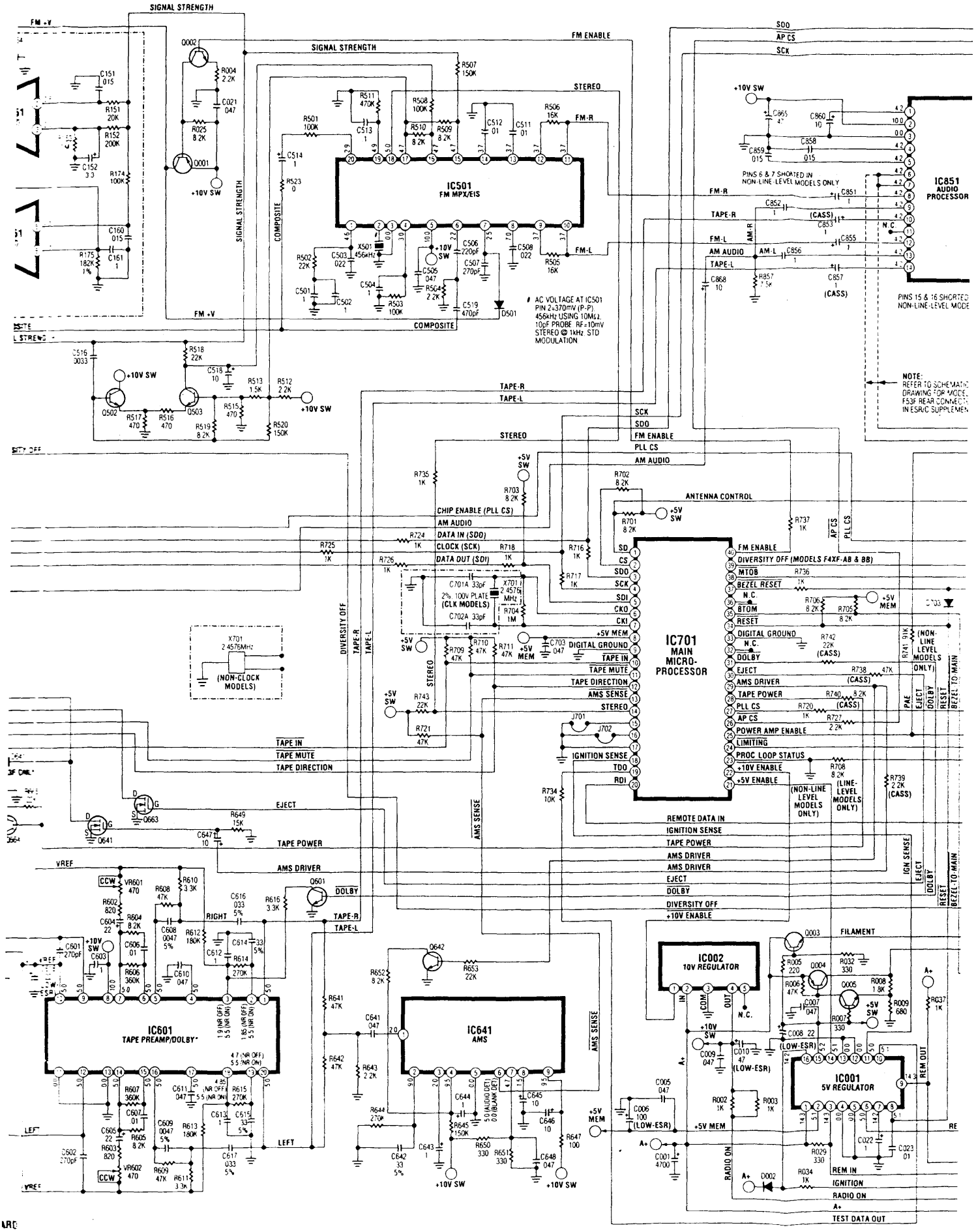
* *Dolby Noise Reduction.*
Dolby is a trademark of Dolby Laboratories Licensing Corporation.

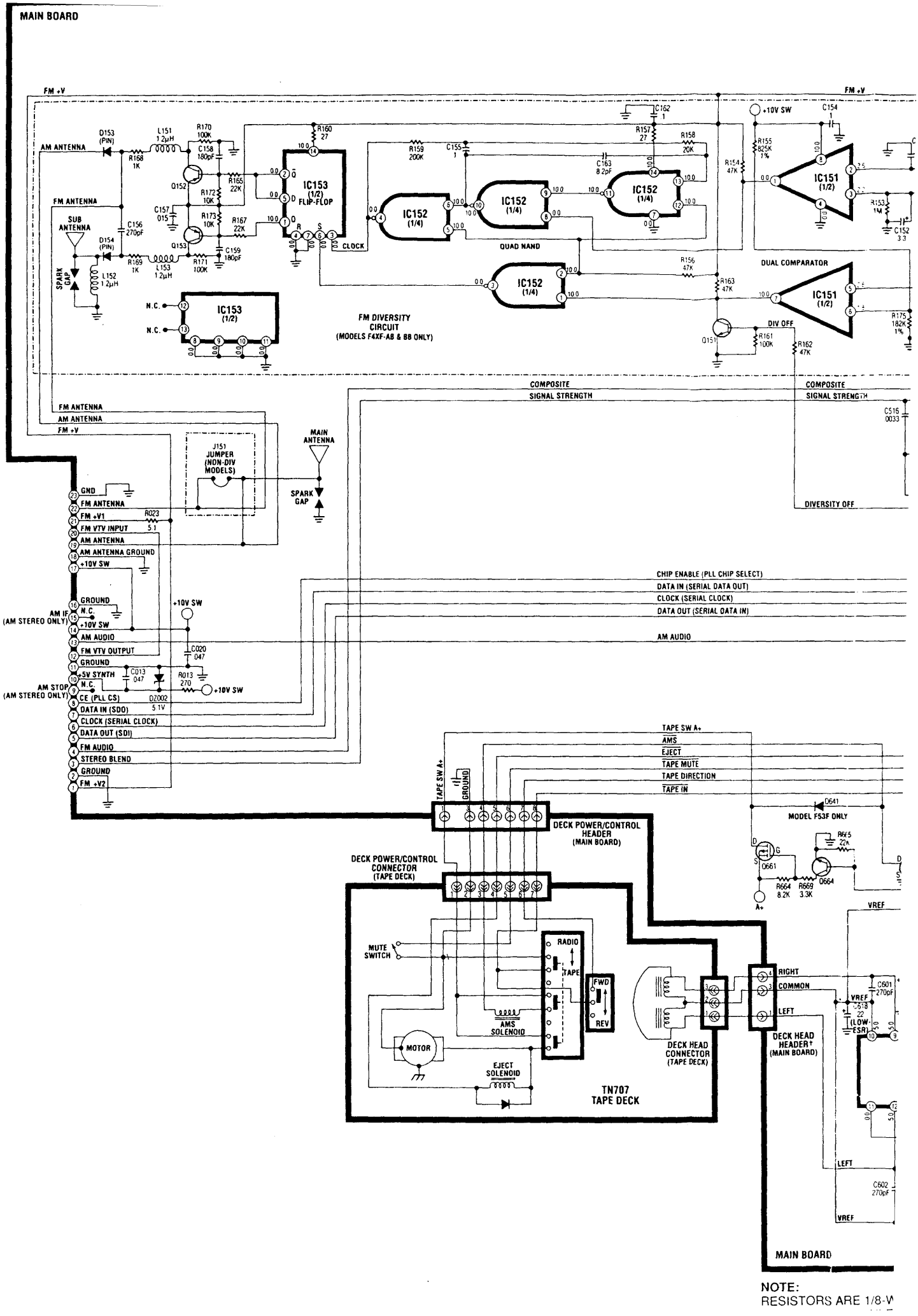
NOTES:
Diversity voltages are with 50µV RF @87.9MHz, no modulation, applied to main antenna socket and standard FM antenna dummy; main antenna selected.

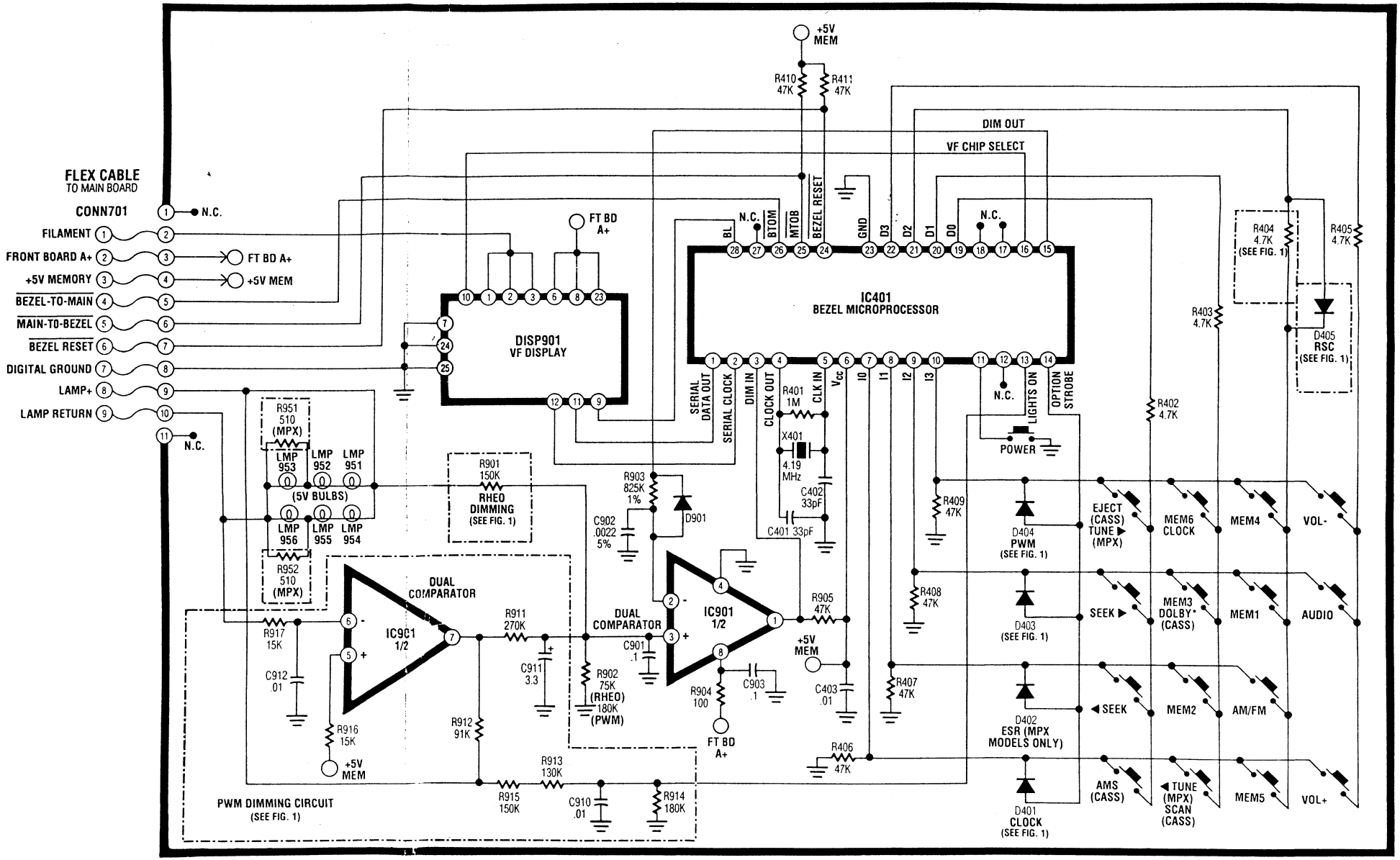
With no RF signal applied:

IC151 pins 2,3,5=noisy DC <0.6V;
pin 7=0V;
pin 1 may randomly switch 10V/0V.
IC152 pins 4,6,8,9,10,11,13 may randomly switch 10V/0V;


IC801
POWER AMPLIFIER FRONT
IC802
POWER AMPLIFIER REAR
IC851
AUDIO PROCESSOR
IC701
MAIN MICRO-PROCESSOR
IC002
10V REGULATOR
IC001
5V REGULATOR
IC803
LINE DRIVER
CONN701
FLEX CABLE CONNECTOR TO FRONT BOARD
(SOLDER SIDE VIEW)
NOTE:
AUDIO VOLTAGES ARE WITH RADIO ON, 14.4V SUPPLY NOT IN LIMITING
NOTE:
REFER TO SCHEMATIC DRAWING FOR MODEL F53F REAR CONNECTOR N.E.S.R.C. SUPPLEMENT
PINS 6 & 7 SHORTED IN NON-LINE-LEVEL MODELS ONLY
PINS 15 & 16 SHORTED IN NON-LINE-LEVEL MODELS ONLY
ANTENNA DRIVER CIRCUIT (F3XF & F4XF MODELS ONLY)
SDO
AP CS
SCK
+10V SW
+5V SW
+5V MEM
FM-R
TAPE-R
FM-L
AM AUDIO
TAPE-L
AM-R
AM-L
(CASS)
N.C.
LF+
RF+
LR+
RR+
LF-OUT
RF-OUT
LR OUT
RR OUT
L-OUT
L-IN
R-OUT
R-IN
POWER AMP ENABLE
ANTENNA CONTROL
REM IN
REM OUT
A+
FM ENABLE
DIVERSITY OFF (MODELS F4XF-A8 & B8)
MTOB
BEZEL RESET
BTOM
RESET
DIGITAL GROUND
DOLBY
EJECT
AMS DRIVER
TAPE POWER
PLL CS
AP CS
POWER AMP ENABLE
LIMITING
PROC LOOP STATUS
+10V ENABLE
+5V ENABLE
(NON-LINE LEVEL MODELS ONLY)
(LINE-LEVEL MODELS ONLY)
REMOTE DATA IN
IGNITION SENSE
TAPE POWER
AMS DRIVER
EJECT
DOLBY
DIVERSITY OFF
+10V ENABLE
BEZEL-TO-MAIN
MAIN-TO-BEZEL
BEZEL RESET
PAE
IGN SENSE
FILAMENT
A+ FRONT BOARD
+5V MEMORY
BEZEL-TO-MAIN
MAIN-TO-BEZEL
BEZEL RESET
DIGITAL GROUND
LAMP+
LAMP RETURN
SIGNAL GROUND
PWR AMP ENABLE
POWER GROUND
LINE-LEVEL MODELS (EXCEPT F53F)
RADIO ON
TEST DATA OUT


IC501
FM MPX/EIS
IC701
MAIN MICRO-PROCESSOR
IC851
AUDIO PROCESSOR
IC601
TAPE PREAMP/DOLBY
IC641
AMS
IC002
10V REGULATOR
IC001
5V REGULATOR
SIGNAL STRENGTH
FM ENABLE
STEREO
COMPOSITE
SCK
SDO
AP CS
PLL CS
AM AUDIO
TAPE-R
TAPE-L
ANTENNA CONTROL
CHIP ENABLE (PLL CS)
DATA IN (SDO)
CLOCK (SCK)
DATA OUT (SDI)
DIVERSITY OFF
TAPE IN
TAPE MUTE
TAPE DIRECTION
AMS SENSE
EJECT
TAPE POWER
AMS DRIVER
DOLBY
IGNITION SENSE
REMOTE DATA IN
RADIO ON
REM IN
TEST DATA OUT
FILAMENT
+10V SW
+5V SW
+5V MEM
VREF
LEFT
RIGHT
BEZEL RESET
PROC LOOP STATUS
+10V ENABLE
+5V ENABLE
POWER AMP ENABLE
LIMITING
TAPE POWER
AMS DRIVER
REM OUT
IGN SENSE
RESET
BEZEL TO MAIN
(NON-CLOCK MODELS)
(CLK MODELS)
(CASS)
(LOW-ESR)
(NON-LINE LEVEL MODELS ONLY)
(LINE-LEVEL MODELS ONLY)
PINS 6 & 7 SHORTED IN NON-LINE-LEVEL MODELS ONLY
PINS 15 & 16 SHORTED NON-LINE-LEVEL MODE
NOTE: REFER TO SCHEMATIC DRAWING FOR MODE F53F REAR CONNECT IN ESRIC SUPPLEME
* AC VOLTAGE AT IC501 PIN 2=370mV (P-P) 456kHz USING 10MΩ, 10pF PROBE RF=10mV STEREO @ 1kHz STD MODULATION
RS ARE 1/8-WATT SMD WITH


MAIN BOARD
FM +V
AM ANTENNA
FM ANTENNA
SUB ANTENNA
SPARK GAP
D153 (PIN)
D154 (PIN)
L151 1.2µH
L152 1.2µH
L153 1.2µH
R168 1K
R169 1K
R170 100K
R171 100K
R172 10K
R173 10K
R165 22K
R167 22K
R160 27
C156 270pF
C157 015
C158 180pF
C159 180pF
Q152
Q153
IC153 (1/2) FLIP-FLOP
CLOCK
IC152 (1/4)
QUAD NAND
R159 200K
C155 1
C162 1
C163 8.2pF
R157 27
R158 20K
R154 47K
R156 47K
R163 47K
R162 47K
R161 100K
Q151
DIV OFF
+10V SW
C154 1
R155 825K 1%
IC151 (1/2)
DUAL COMPARATOR
R153 1M
C152 3.3
R175 182K 1%
N.C.
FM DIVERSITY CIRCUIT
(MODELS F4XF-A8 & 8B ONLY)
COMPOSITE SIGNAL STRENGTH
C516 0033
DIVERSITY OFF
J151 JUMPER (NON-DIV MODELS)
MAIN ANTENNA
SPARK GAP
GND
FM ANTENNA
FM +V1
FM VTV INPUT
AM ANTENNA
AM ANTENNA GROUND
+10V SW
R023 5.1
GROUND
AM IF (AM STEREO ONLY)
N.C.
+10V SW
AM AUDIO
FM VTV OUTPUT
GROUND
+5V SYNTH
AM STOP (AM STEREO ONLY)
N.C.
CE (PLL CS)
DATA IN (SDO)
CLOCK (SERIAL CLOCK)
DATA OUT (SDI)
FM AUDIO
STEREO BLEND
GROUND
FM +V2
C013 047
C020 047
R013 270
DZ002 5.1V
CHIP ENABLE (PLL CHIP SELECT)
DATA IN (SERIAL DATA OUT)
CLOCK (SERIAL CLOCK)
DATA OUT (SERIAL DATA IN)
AM AUDIO
TAPE SW A+
AMS
EJECT
TAPE MUTE
TAPE DIRECTION
TAPE IN
GROUND
DECK POWER/CONTROL HEADER (MAIN BOARD)
DECK POWER/CONTROL CONNECTOR (TAPE DECK)
D641
MODEL F53F ONLY
R665 22k
Q661
Q664
R664 8.2K
R669 3.3K
A+
MUTE SWITCH
RADIO
TAPE
FWD
REV
AMS SOLENOID
MOTOR
EJECT SOLENOID
TN707 TAPE DECK
DECK HEAD CONNECTOR (TAPE DECK)
DECK HEAD HEADER† (MAIN BOARD)
RIGHT
COMMON
LEFT
VREF
C601 270pF
C618 22 (LOW-ESR)
C602 270pF
MAIN BOARD
NOTE:
RESISTORS ARE 1/8-W


FLEX CABLE
TO MAIN BOARD
CONN701
FILAMENT
FRONT BOARD A+
+5V MEMORY
BEZEL-TO-MAIN
MAIN-TO-BEZEL
BEZEL RESET
DIGITAL GROUND
LAMP+
LAMP RETURN
N.C.
FT BD A+
+5V MEM
DISP901
VF DISPLAY
IC401
BEZEL MICROPROCESSOR
DIM OUT
VF CHIP SELECT
SERIAL DATA OUT
SERIAL CLOCK
DIM IN
CLOCK OUT
CLK IN
LIGHTS ON
OPTION STROBE
POWER
X401
4.19 MHz
R401 1M
C402 33pF
C401 33pF
R951 510 (MPX)
R952 510 (MPX)
LMP 953
LMP 952
LMP 951
LMP 956
LMP 955
LMP 954
(5V BULBS)
R901 150K
RHEO DIMMING
(SEE FIG. 1)
R903 825K 1%
D901
C902 .0022 5%
DUAL COMPARATOR
IC901 1/2
R917 15K
C912 .01
R916 15K
R911 270K
C911 3.3
R912 91K
R902 75K (RHEO) 180K (PWM)
C901 .1
R904 100
C903 .1
R905 47K
C403 .01
R913 130K
R915 150K
C910 .01
R914 180K
PWM DIMMING CIRCUIT
(SEE FIG. 1)
R410 47K
R411 47K
R409 47K
R408 47K
R407 47K
R406 47K
R402 4.7K
R403 4.7K
R404 4.7K (SEE FIG. 1)
R405 4.7K
D405 RSC (SEE FIG. 1)
D404 PWM (SEE FIG. 1)
D403 (SEE FIG. 1)
D402 ESR (MPX MODELS ONLY)
D401 CLOCK (SEE FIG. 1)
EJECT (CASS) TUNE ▶ (MPX)
SEEK ▶
◀ SEEK
◀ TUNE (MPX) SCAN (CASS)
MEM6 CLOCK
MEM3 DOLBY* (CASS)
MEM2
AMS (CASS)
MEM4
MEM1
AM/FM
MEM5
VOL-
AUDIO
VOL+

Component Application Chart

Model	Components							
	D401	D402	D403	D404	D405	R404	R901	PWM Dimming Circuit
Multiplex								
F3AF		■				■	■	
F3DF		■				■	■	
F3XF		■			■			■
F3ZF	■				■		■	
F31F		■				■	■	
F32F		■				■		■
F33F	■	■				■	■	
F4BF	■	■		■		■		■
F4CF	■	■		■		■		■
F4TF	■	■				■	■	
F4UF	■	■				■	■	
F4ZF	■	■				■	■	
F47F	■	■				■	■	
F48F	■	■			■		■	
Cassette								
F3AF						■	■	
F3DF						■	■	
F31F						■	■	
F32F(LL)		■	■			■		■
F33F	■					■	■	
F37F	■					■	■	
F4BF-AB	■			■		■	■	■
F4BF-BB(LL)	■			■			■	■
F4CF	■			■		■	■	■
F4CF-CC(LL)	■			■				■
F4SF						■	■	
F4TF	■					■	■	
F4UF	■					■	■	
F4XF-AB(LL)	■		■					■
F4XF-BB(LL)			■					■
F4XF-CA	■		■		■			■
F4XF-DA	■		■		■			■
F4ZF					■		■	
F48F	■				■		■	■
F53F(LL)							■	

IC901 Voltages

Pin	Function	Voltage
1	RC Voltage (pin 2) Below Dimming Level Threshold Dimming Level Threshold Exeeded	5V 0V
2	Headlights Off (peak RC network voltage) Headlights On (peak RC network voltage)	0-0 3V 0 3-5V
3	Headlights Off Headlights On	0-0 3V 0 3-5V
4		Ground
5		+5V
6	Headlights Off Headlights On	0V 0/14 4V PWM
7	Headlights Off Headlights On	0V 0/14 4V PWM
8	Headlights On Headlights Off	14 4V 0V

Notes:

Resistors are 1/8 Watt SMD
with value in Ohms unless noted

Capacitance values are
in Microfarads unless noted

**Dolby Noise Reduction*
Dolby is a trademark of Dolby Laboratories Licensing Corporation

Schematic Diagram
Front Board